

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-307831

(43)Date of publication of application : 23.10.2002

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(51)Int.CI.

B41M 5/26

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(21)Application number : 2001-117177

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(22)Date of filing : 16.04.2001

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## (54) HEAT-SENSITIVE RECORDING MEDIUM

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a heat-sensitive recording medium which has good ink receiving properties while heat transfer recording is performed and can perform recording without having no possibility of generating sticking, scum of printing, etc., while heat-sensitive recording is performed in the heat-sensitive recording medium provided with a heat-sensitive recording layer consisting of at least one layer comprising an electron-donating ordinarily colorless or light-colored dye precursor and an electron-accepting color developing agent which reacts by heating and develops the dye precursor on a substrate.

**SOLUTION:** By incorporating polyolefin resin particles in an over-coat layer for the heat-sensitive recording medium, the heat-sensitive recording medium which has good ink receiving properties while heat transfer recording is performed and can perform recording without having no possibility of generating sticking, scum of printing, etc., while heat-sensitive recording is performed is provided.

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### LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

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**CLAIMS**

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**[Claim(s)]**

**[Claim 1]** The thermal recording medium characterized by preparing the overcoat layer containing a polyolefine system resin particle on this heat-sensitive recording layer in the thermal recording medium containing the developer of electronic receptiveness which electron-donative makes color this color precursor usually in response to a base material top the color precursor of colorlessness thru/or light color, and the time of heating which prepared the heat-sensitive recording layer which consists of one or more layers.

**[Claim 2]** The thermal recording medium according to claim 1 characterized by the mean particle diameter of this polyolefine system resin particle being 1 thru/or 20 micrometers.

**[Claim 3]** The thermal recording medium according to claim 1 characterized by this polyolefine system resin particle being low consistency polyolefin resin.

**[Claim 4]** The thermal recording medium according to claim 1 characterized by this polyolefine system resin being vinyl acetate system copolymerization resin.

**[Claim 5]** The thermal recording medium according to claim 1 characterized by the solid content concentration in the overcoat layer of this polyolefine system resin particle being 5 thru/or 90 % of the weight.

**[Claim 6]** The thermal recording medium according to claim 1 characterized by the amount of coating of this overcoat layer being two or less 3 g/m.

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**TECHNICAL FIELD**

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[Field of the Invention] This invention relates to the thermal recording medium which prepared the heat-sensitive recording layer and the overcoat layer with hot printing acceptance nature on the base material.

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PRIOR ART

[Description of the Prior Art] Generally a thermal recording medium is what prepared the heat-sensitive recording layer which consists of the thermal recording component which uses as a principal component the developer of electronic receptiveness which electron-donative makes color this color precursor usually in response to a base material top the color precursor of colorlessness thru/or light color, and the time of heating. By heating with a thermal head (heat head), a heat stylus, laser light, etc., a color precursor and a developer carry out an instant reaction, a coloring image is obtained, and it is indicated by JP,43-4160,B, JP,45-14039,B, etc. [0003] Such a thermal recording medium can be recorded with comparatively easy equipment, has advantages, like that maintenance is easy and there is no generating of the noise, and is used for wide range fields, such as an automatic vending machine of a measurement recorder, facsimile, a printer, the terminal of a computer, a label, and a ticket. A thermal recording medium is used also for financial-related record forms, such as receipts, such as gas, a waterworks, and an electricity bill, a use specification of ATM of a financial institution, and various receipts, especially in recent years.

[0004] On the other hand, from the tooth back of the sensible-heat ribbon which applied the ink of thermofusion nature on the base material, heating according to an information signal is performed with a heat head, and the thermal imprint recording method which imprints the ink which fused and fused ink on a record medium is also held using comparatively easy equipment. A thermal imprint recording method can perform multicolor printing comparatively easily by using two or more ink ribbons from which a color tone differs. On the other hand, two or more ink ribbons must be used and the need from the flow of cost reduction in recent years and trash reduction to thermal recording without the need for an ink ribbon and its supplement exchange has been increasing.

[0005] A thermal recording medium which can be used for both methods is desired without often performing these thermal recording equipment and thermal-transfer-recording equipment from the similarity on structure using the same equipment, and caring about the difference in a recording method in the transition stage of shift of a present recording method.

[0006] The ink ribbon side and record medium which were pushed by the thermal head need to stick completely, and it is necessary to receive ink to homogeneity, and if the property which each record medium is expected is described briefly, it is necessary to fully bind with a thermal-transfer-recording medium so that there may be no dedropping. Therefore, what applied the polymer which has the binder component of ink and sufficient binding property on the base material is used widely. On the other hand, by the thermal recording medium, it is required to prepare the heat-sensitive recording layer colored with heating on a base material.

[0007] Therefore, as for the record medium corresponding to these two recording methods, it is desirable to prepare a heat-sensitive recording layer on a base material, and to prepare a hot printing acceptance layer on it. Since materials, such as a high polymer of hot printing ink acceptance nature, are used when such a record medium is used as a thermal recording medium, it is easy to produce sticking, printing dregs, etc., and in order to carry out amelioration prevention of these, concomitant use of a pigment, lubricant, etc. is needed. On the other hand, concomitant use of a pigment or lubricant makes surface smooth nature and a binding property

with ink fall, and is not desirable as a thermal-transfer-recording medium. Therefore, the actual condition is that there is no record medium with which it can still be satisfied of two recording methods enough.

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**TECHNICAL PROBLEM**

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[Problem(s) to be Solved by the Invention] The purpose of this invention is to offer the thermal recording medium which can be recorded without having good ink acceptance nature also at the time of thermal transfer recording, and producing sticking, printing dregs, etc. also at the time of thermal recording in the thermal recording medium containing the developer of electronic receptiveness which electron-donative makes color this color precursor usually in response to a base material top the color precursor of colorlessness thru/or light color, and the time of heating which prepared the heat-sensitive recording layer which consists of at least one or more layers.

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## English Translation of JP2002-307831A

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## MEANS TO SOLVE THE PROBLEM

As a result that the people of present invention studied zealously, the ink acceptance characteristics that is good at the time of thermal ink transfer recording by incorporating polyolefin resin corpuscle into an overcoat layer of thermal recording atmosphere are had, the multicolor thermal recording medium which could be recorded without producing ステイッキング, print refuse at the time of thermal recording became invent.

[0010]

## MODE FOR CARRYING OUT THE INVENTION

As for the thermal recording atmosphere of the present invention, it is provided dye precursor of normal colorlessness or a pale color of electro-donicity and the color precursor on support by what is provided with thermal recording layer containing developer of electron-accepting making do coloring at heat time.

The only operative example that coloring does in red system color, yellow system color, blue system color, green system color, black system color as dye precursor used with the present invention is given, but is not limited to these.

[0011]

It is 3,3- screw (1-n- butyl -2 - methylindole -3 - yl) phthalide, 3,3- screw (1-n- butyl -2 - methylindole -3 - yl) tetrachloro phthalide, 3,3- screw (1-n- butyl indole -3 - yl) phthalide, 3,3- screw (1-n- pentyl -2 - methylindole -3 - yl) phthalide, 3,3- screw (1-n- hexyl -2 - methylindole -3 - yl) phthalide, 3,3- screw (1-n- octyl -2 - methylindole -3 - yl) phthalide, 3,3- bis (one - carbonyl -2 - methylindole -3 - yl) phthalide, 3,3- bis (one - ethyl -2 - methylindole -3 - yl) phthalide, 3,3- bis (one - propyl -2 - methylindole -3 - yl) phthalide, 3,3- bis (two methylindole -3 - yl) phthalide, Rhodamine B - anilino lactam, Rhodamine B - (o- chloroanilino) lactam, Rhodamine B - (p- nitroanilino) lactam, three - diethylamino -5 - carbonyl -7 - dibenzylamino full Oran, three - diethylamino -6 - carbonyl -7 - chlorofull Oran, three - diethylamino -6 - methoxy full Oran, three - diethylamino as red system dyeing charges precursor Mino -6 - carbonyl full Oran, three - diethylamino -6 - carbonyl -7 - chloro-8 - benzil full Oran, three 6,7- - diethylamino - dimethyl full Oran, three 6,8- - diethylamino - dimethyl full Oran, three - diethylamino -7 - chlorofull Oran, three - diethylamino -7 - methoxy full Oran, three - diethylamino -7 - (N- acetyl -N- carbonyl) amino full Oran, three - diethylamino -7 - carbonyl full Oran, three -

diethylamino -7 - carbonyl ethoxy full Oran, three - diethylamino -7-p- methylphenyl full Oran, three 7,8- - diethylamino - Ben Zopf Luo orchid, three - diethylamino benz [a] full Oran, three - diethylamino benz [c] full Oran, three - dimethylamino -7 - methoxy full Oran, three - dimethylamino -6 - carbonyl -7 - chlorofull Oran, three - dimethylamino -7 - carbonyl full Oran, three - dimethylamino -7 - chlorofull Oran, three - (N- ethyl -p- toluidino) -7 - carbonyl full Oran, three - (N- ethyl -N- isoamyl) amino -6 - carbonyl -7 - chlorofull Oran, three 7,8- - (N- ethyl -N- isoamyl) amino - Ben Zopf Luo orchid, three - (N- Ettie) Roux -N- isoamyl) amino -7 - carbonyl full Oran, three - (N- ethyl -N-n- octyl) amino -6 - carbonyl -7 - chlorofull Oran, three 7,8- - (N- ethyl -N-n- octyl) amino - Ben Zopf Luo run, three - (N- ethyl -N-n- octyl) amino -7 - carbonyl full Oran, three - (N- ethyl -N-n- octyl) amino -7 - chlorofull Oran, three 7,8- - (N- ethyl -N-4- methylphenyl) amino - Ben Zopf Luo orchid, three - (N- ethyl -N-4- methylphenyl) amino -7 - carbonyl full Oran, three 7,8- - (N- isopentyl -N- ethyl) amino - Ben Zopf Luo orchid, three 7,8- - (N- ethoxyethyl -N- ethyl) amino -7 - chlorofull Oran, 3-n- dibutyl amino -6 - carbonyl -7 - chlorofull Oran, 7,8- 3-n- dibutyl amino - Ben Zopf Luo orchid, 3-n- dibutyl amino -7 - chlorofull Oran, 3-n- dibutyl amino -7 - carbonyl full Oran, three 7,8- - diallyl amino - Ben Zopf Luo orchid, three - diallyl amino -7 - chlorofull Oran.

Three - di-n- butylamino -6 - carbonyl -7 - プロモフルオラン, three - cyclohexyl amino -6 - chlorofull Oran, three - pyrrolidyl amino -7 - carbonyl full Oran, three - ethylamino -7 - carbonyl full Oran, three - diethylamino - benz [a] full Oran, 3-N- ethyl -N- isoamyl amino - benz [a] full Oran, 3-N- ethyl -N-p- methylphenyl amino -7 - carbonyl full Oran, three - dibutyl amino -6 - carbonyl -7 - プロモフルオラン, 3,6-bis (diethylamino full Oran) - gamma - (four ' - nitro) anilino lactam.

#### [0012]

As yellow system dyeing charges precursor, it is 3,6- dimethoxy full Oran, three - cyclohexyl amino -6 - choro full Oran, 2,6- diphenyl -4 - (four - dimethylaminophenyl) - pyridine, 2,2- screw (four two four - (- diethylaminophenyl) cinchona zoril) Oki ti phenyl) propane, four - chloro-N- (four four - (N- (- methylbenzyl) -N- methylamino) benzylidene) aniline, one - (two - quinolyl) -2 - (three - methoxy -4 - doh decyloxy phenyl) ethene, one - (4-n- doh decyloxy -3 - methoxyphenyl) -2 - (two - quinolyl) ethylene.

#### [0013]

For dyeing charges precursor pro-blue, three - (one - ethyl -2 - methylindole -3 - yl) -3 - (four - diethylaminophenyl) phthalide, three - (one - ethyl -2 - methylindole -3 - yl) -3 - (two - carbonyl -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -2 - carbonyl India - roux -3 - yl) -3 - (two - ethoxy -4 - aminophenyl) -4 - アザフタリド, three - (one - ethyl -2 - carbonyl India - roux -3 - yl) -3 - (two - ethoxy -4 - methylamino phenyl) -4 - アザフタリド, three - (one - ethyl -2 - carbonyl India - roux -3 - yl) -3 - (two - ethoxy -4 - ethylamino phenyl) -4 - アザフタリド, three - (one - ethyl



-4 - the) Ethylamino phenyl) -4 - アザフタリド, three - (one - ethyl -2 - carbaryl India - roux -3 - yl) -3 - (three - carbaryl -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -2 - carbaryl India - roux -3 - yl) -3 - (two - nitro -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -2 - carbaryl India - roux -3 - yl) -3 - (two - allyl -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -2 - carbaryl India - roux -3 - yl) -3 - (two - hydroxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -2 - carbaryl India - roux -3 - yl) -3 - (two - cyano -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -2 - carbaryl India - roux -3 - yl) -3 - (two - cyclohexyl ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -2 - carbaryl India - roux -3 - yl) -3 - (two - carbaryl ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -2 - carbaryl India - roux -3 - yl) -3 - (two - cyclohexyl ethyl -4 - diethylaminophenyl) -4 - アザフタリド, three - (two - ethyl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -2 - black loin doh - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -2 - プロモインド - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -2 - ethyl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -2 - propyl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -2 - methoxy Indian - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -2 - ethoxy India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -2 - phenyl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -2 - carbaryl India - roux -3 - yl) -3 - (2) - ethoxy -4 - diethylaminophenyl) -7 - アザフタリド, three 4,7 - (one - ethyl -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -ジアザフタリド, three - (one 4,5,6,7 - ethyl - tetrachloro -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -4 - nitro -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -4 - methoxy -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -4 - methylamino -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethyl -4 - carbaryl -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (two - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - chloro -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - プロモ -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - carbaryl -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - carbaryl -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl)

-7 - アザフタリド, three - (one - propyl -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - butyl -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - butyl -2 - India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -7 - アザフタリド, three - (one - pentyl -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - hexyl -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4s - アザフタリド, three - (one - hexyl -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -7 - アザフタリド, three - (one - octyl -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - octyl -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -7 - アザフタリド, three - (one - octyl -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - nonyl -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - methoxy -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - ethoxy -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - phenyl -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -4 - アザフタリド, three - (one - pentyl -2 - メチルインドール) India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -7 - アザフタリド, three - (one - heptyl -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -7 - アザフタリド, three - (one - nonyl -2 - carbaryl India - roux -3 - yl) -3 - (two - ethoxy -4 - diethylaminophenyl) -7 - アザフタリド, 3,3-screw (p-dimethylaminophenyl) -6 - dimethylamino phthalide, three - (four - dimethylamino -2 - methylphenyl) -3 - (four - dimethylaminophenyl) -6 - dimethylamino phthalide, three - (one - ethyl -2 - methylindole -3 - yl) -3 - (four - diethylamino -2-n-hexyloxyphenyl) -4 - アザフタリド.

## [0014]

For dyeing charges precursor pro-green, three - (N-ethyl -N-n-hexyl) amino -7 - anilino full Oran, three - (N-ethyl -N-p-tolyl) amino -7 - (N-phenyl -N-carbaryl) amino full Oran, three - (N-ethyl -N-n-propyl) amino -7 - dibenzylamino full Oran, three - (N-ethyl -N-n-propyl) amino -6 - chloro-7 - dibenzylamino full Oran, three - (N-ethyl -N-4-methylphenyl) amino -7 - (N-carbaryl -N-phenyl) amino full Oran, three - (N-ethyl -4 - methylphenyl) amino -6 - carbaryl -7 - dibenzylamino full Oran, three - (N-ethyl -4 - methylphenyl) amino -6 - carbaryl -7 - (N-carbaryl -benzil) amino full Oran, three - (N-carbaryl -N-n-hexyl) amino -7 - anilino full Oran, three - (N-propyl -N-n-hexyl) amino -7 - anilino full Oran, three - (N-n-pentyl -N-allyl) amino -6 - carbaryl -7 - anilino full Oran, three - (N-n-pentyl -N-allyl) amino -7 - anilino full Oran, 3-n-dibutyl amino -6 - carbaryl -7 - (two - chloroanilino) full Oran, 3-n-dibutyl amino -6 - carbaryl -7 - (two - chloroanilino) full Oran, 3-n-dibutyl amino -6

- carbonyl -7 - (two - fluoro anilino) full Oran, 3-n- dibutyl amino -7 - (two - chloroanilino) full Oran, 3-n- dibutyl amino -7 - (two - chlorobenzyl anilino) full Oran, 3, 3-bis (four - diethylamino -2 - ethoxyphenyl) -4 - アザフタリド, 3, 6-bis (dimethylamino) fluorene -9 - spiro -3' - (six' - dimethylamino) phthalide, three - diethylamino -6 - carbonyl -7 - benzylamino - full Oran, three - diethylamino -6 - carbonyl -7 - dibenzylamino full Oran, three - diethylamino -6 - carbonyl -7 - (N- cyclohexyl -N- benzylamino) full Oran, three - diethylamino -6 - carbonyl -7 - (two - chloroanilino) full Oran, three - diethylamino -6 - carbonyl -7 - (two - trifluoromethyl anilino) full Oran, three - Diethylamino -6 - carbonyl -7 - (three - trifluoromethyl anilino) full Oran, three - diethylamino -6 - carbonyl -7 - (two - ethoxy anilino) full Oran, three - diethylamino -6 - carbonyl -7 - (four - ethoxy anilino) full Oran, three - diethylamino -6 - chloro-7 - (two - chloroanilino) full Oran, three - diethylamino -6 - chloro-7 - dibenzylamino full Oran, three - diethylamino -6 - chloro-7 - anilino full Oran, three - diethylamino -6 - ethyl ethoxy -7 - anilino full Oran, three - diethylamino -7 - anilino full Oran, three - diethylamino -7 - methylanilino full Oran, three - diethylamino -7 - dibenzylamino full Oran, three - diethylamino -7-n- octyl amino full Oran, three - diethylamino -7-p- chloro anilino full Oran, three - diethylamino -7-p- methylphenyl anilino full Oran, three - diethylamino -7 - (N- cyclohexyl -N- benzylamino) full Oran, three - diethylamino -7 - (two - chloroanilino) full Oran, three - diethylamino -7 - (three - trifluoro anilino) full Oran, three - diethylamino -7 - (two - trifluoromethyl anilino) full Oran, three - diethylamino -7 - (two - ethoxy anilino) full Oran, three - diethylamino -7 - (four - ethoxy anilino) full Oran, three - diethylamino -7 - (two - chlorobenzyl anilino) full Oran, three - dimethylamino -6 - chloro-7 - dibenzylamino full Oran, three - dimethylamino -6 - carbonyl -7-n- octyl amino full Oran, three - dimethylamino -7 - dibenzylamino full Oran, three - dimethylamino -7-n- octyl amino full Oran, three - dibutyl amino -7 - (two - fluoro anilino) full Oran, three - 0-6- p- (p- anilino anilino) anilino carbonyl -7 - chlorofull Oran, three - anilino -7 - dibenzylamino full Oran, three - anilino -6 - carbonyl -7 - dibenzylamino full Oran, three - pyrrolidino -7 - dibenzylamino full Oran, three seven - pyrrolidino - (- cyclohexyl anilino) full Oran, three - dibenzylamino -6 - carbonyl -7 - dibenzylamino full Oran, three - dibenzylamino -7 - dibenzylamino full Oran, three two - dibenzylamino -7 - (- chloroanilino) full Oran.]

[0015]

For dyeing charges precursor pro-guilt, three - dibutyl amino -6 - carbonyl -7 - anilino full Oran, three - dibutyl amino -6 - carbonyl -7 - phenylamino full Oran, three - dibutyl amino -7 - (two - chloroanilino) full Oran, three - dibutyl amino -7 - (o- chlorophenyl) amino full Oran, three - diethylamino -6 - carbonyl -7 - anilino full Oran, three - diethylamino -6 - carbonyl -7 - phenylamino full Oran, three - diethylamino -6 - carbonyl -7 - キシリジノフルオラン, three - diethylamino -7 - (two - chloroanilino) full Oran, three

- diethylamino -7 - (o- chlorophenyl) amino full Oran, three - diethylamino -7 - (o- chlorophenyl) amino - full Oran, three - diethylamino -7 - (two - carbomethoxy - phenylamino) full Oran, three - (N- cyclohexyl -N- carbaryl) amino -6 - carbaryl -7 - anilino full Oran, three - (N- cyclohexyl -N- carbaryl) amino -6 - carbaryl -7 - phenylamino full Oran, three - (N- cyclopentyl -N- ethyl) amino -6 - carbaryl -7 - phenylamino full Oran,

There are three - (N- isoamyl -N- ethyl) amino -6 - carbaryl -7 - anilino full Oran, three - (N- ethyl -p- toluidino) -6 - carbaryl -7 - anilino full Oran, three - (N- ethyl -p- toluidino) -6 - carbaryl -7 - (p- toluidino) full Oran, three - (N- ethyl -N- isoamyl) amino -6 - carbaryl -7 - phenylamino full Oran, three - (N- carbaryl -N- tetrahydro furfuryl) amino -6 - carbaryl -7 - phenylamino full Oran, three - (N- ethyl -N- tetrahydro furfuryl) amino -6 - carbaryl -7 - phenylamino full Oran, three - pyrrolidino -6 - carbaryl -7 - phenylamino full Oran, three - pyrrolidino -6 - carbaryl -7-p- butylphenyl amino full Oran, three - piperidino -6 - carbaryl -7 - phenylamino full Oran, two - phenylamino -3 - carbaryl -6 - (N- ethyl -N-p- toluyl) amino - full Oran.

[0016]

Next,

For example, for developer of the dye precursor and the electron-accepting which it is responded, and do color development, a thing as shown in follows is given.

[0017]

4, 4' - dihydroxy diphenylsulphon, 2, 4' - dihydroxy diphenylsulphon, four - hydroxy -4' - isopropoxy diphenylsulphon, four - hydroxy -4' - benzyloxy diphenylsulphon, four - hydroxy -4' - propoxy diphenylsulphon, screw (three - allyl -4 - hydroxyphenyl) sulfone, 3, 4- dihydroxy -4' - carbaryl diphenylsulphon, four - hydroxy -4' - benzensulphonyl Oki ti diphenylsulphon, 2, 4- bis (phenylsulfonyl) phenol, p- phenylphenol, p- hydroxyacetophenone, 1, 1- bis (p- hydroxyphenyl) propane, 1, 1- bis (p- hydroxyphenyl) pentane, 1, 1- bis (p- hydroxyphenyl) hexane, 1, 1- bis (p- hydroxyphenyl) cyclohexane, 2, 2- bis (p- hydroxyphenyl) propane, 2, 2- bis (p- hydroxyphenyl) hexane, 1, 1- bis (p- hydroxyphenyl) -2 - ethylhexane, 2, 2- bis (three - chloro-4 - hydroxyphenyl) propane, 1, 1- bis (p- hydroxyphenyl) -1 - phenylethane.

1, 3- two di- [- (p- hydroxyphenyl) -2 - propyl] benzene, 1, 3- two di- [- (3, 4- dihydroxyphenyl) -2 - propyl] benzene, 1, 4- two di- [- (p- hydroxyphenyl) -2 - propyl] benzene, 4, 4' - hydroxy diphenyl ether, 3, 3 4, 4' - dichloro - ' - hydroxy diphenyl sulfide, 2, 2- screw (four - hydroxyphenyl) methyl acetate, 2, 2- screw (four - hydroxyphenyl) butyl acetate, 4, 4' - チオビス (2-tert- butyl -5 - methylphenol), four - hydroxy dimethyl phthalate, four - hydroxy benzyl benzoate, four - hydroxybenzonate methyl, gallic acid benzil, gallic acid stearyl, N, N' - diphenylthiourea, 4, 4' - bis (three four - (- methylphenyl sulfonyl) ureide) diphenyl-methane, N- (four - methylphenyl sulfonyl) -N' - phenylurea, salicylanilide, five - chlorosalicylanilide, salicylic acid, 3, 5- di- Tasha Reeve till salicylic acid, 3, 5- di-  $\alpha$  - methylbenzyl salicylic acid, four - [2' - (four

- methoxyphenoxy) ethyl Oki ti] salicylic acid.

Three - (octyloxy carbonylamino) salicylic acid or metallic salt of these salicylic acid derivatives, N- (four - hydroxyphenyl) -p- toluene sulfonamide, N- (four - hydroxyphenyl) benzene sulfonamide, N- (four - hydroxyphenyl) -1 - naphthalenesulfonamide, N- (four - hydroxyphenyl) -2 - naphthalenesulfonamide, N- (four - hydroxy naphthyl) -p- toluene sulfonamide, N- (four - hydroxy naphthyl) benzene sulfonamide, N- (four - hydroxy naphthyl) -1 - naphthalenesulfonamide, N- (four - hydroxy naphthyl) -2 - naphthalenesulfonamide, N- (three - hydroxyphenyl) -p- toluene sulfonamide, N- (three - hydroxyphenyl) benzene sulfonamide, N- (three - hydroxyphenyl) -1 - naphthalenesulfonamide, N- (three - hydroxyphenyl) -2 - naphthalenesulfonamide are given.

Or these mix more than two kinds alone, and 100-700 are desirable, and it is used at the rate of 150-400 part by weight as against 100 total weight part by weight of dye precursor.

[0018]

Thermal recording atmosphere of the present invention can incorporate heat fusibility matter into the thermal recording layer if necessary to improve thermal responsiveness.

For this case,

A thing having a melt point of 60 degrees Celsius - 180 degrees Celsius is preferable and a thing having a melt point of 80 degrees Celsius - 140 degrees Celsius in particular depends and is desirable.

[0019]

For heat fusibility matter (sensitizing agent) to improve such a thermal responsiveness, N-hydroxymethyl stearic acid amide, stearic acid amide, Barumi Japanese spaniel acid amide, oleic amide, ethylenebis stearic acid amide, 12-hydroxyoleic acid amide, paraffin wax, microcrystallin wax, polyethylene wax, rice wax, waxes such as carnauba wax, naphthols such as two - benzyloxy naphthalene, p- benzil biphenyl, four - allyloxy biphenyl, biphenyls such as m- terphenyl, 1,2- bis (three - methylphenoxy) ethane, 2,2' - bis (four - methoxyphenoxy) diethyl ether, poly ether compound such as bis (four - methoxyphenyl) ether, diphenyl carbonate, oxalic acid dibenzyl, carbonic acid such as oxalic acid di(p-chlorobenzyl) ester or oxalic acid diester derivative is given, but the present invention is not limited to this.

[0020]

Or these sensitizing agent mixes more than two kinds alone, and it can be used.

In addition,

When it is usually used as the thermal recording layer which is based on developer of electro-donicity color precursor and electron-accepting of colorlessness - a pale color to get enough thermal responsiveness, preferred, even more particularly, what 30-350 % by weight is used as depend, and what 20-400 % by weight is used as for the electro-donicity color precursor is desirable.

[0021]

The thermal recording layer in the present invention is formed by providing thermal recording component over support.

Manner to provide thermal recording component over support is not limited in particular, but manner to print manner to apply coating fluid including thermal recording constituent, ink including thermal recording constituent can be used.

In addition,

A binder can be incorporated into the thermal recording layer if necessary.

A binder to incorporate into the thermal recording layer is not limited in particular, but particularly preferred, the thing that there is little effect to give chromogenic property of thermal recording component is used.

[0022]

As an operative example of a binder to apply to the thermal recording layer in the present invention and an overcoat layer, it is aquaresin such as starch, hydroxyethyl cellulose, methyl cellulose, ethyl cellulose, carboxymethyl-cellulose, gelatine, casein, polyvinyl alcohol, degeneration polyvinyl alcohol, polyacrylic acid, polymethyl methacrylate, polyacrylate, polymethacrylic acid ester, polysodium acrylate.

Polyethylene terephthalate, polybutylene terephthalate, chlorinated polyether, allyl resin, furan resin, ketone resin, oxybenzoyl polyester, polyacetal, polyetheretherketone, polyethersulfone, polyimide, polyamide, polyamide-imide, poly amino bismaleimide, polymethylpentene, polyphenylene oxide, polyphenylene sulfide, polyphenylene sulfone, polysulfone, polyarylate, poly allyl sulfone, polybutadiene, polycarbonate, polyethylene, polypropylene, polystyrene, polyvinylchloride, polyvinylidene chloride, polyurethane, phenol resin, urea resin, melamine resin, melamine formalin resin, a benzoguanamine resin, BT resin, alkyd resin, amino resin, epoxide resin, unsaturated polyester resin, styrene / butadiene copolymer, acrylonitrile / butadiene copolymer, methyl acrylate / butadiene copolymer, ethylene / acetic acid vinyl copolymer, acrylic acid amide / acrylate copolymer, acrylic acid amide / acrylate / methacrylic acid 3 yuan copolymer, styrene / maleic anhydride copolymerization Water-dispersibility resin such as alkali salt of body, alkali salt of ethylene / maleic anhydride copolymer or ammonium salt is given, or it is mixed more than two kinds alone, and these can be used.

[0023]

Copolymer with various principal monomer can be used as polyolefin resin corpuscle used for an overcoat layer in the present invention only as well as independent copolymer of single olefin.

[0024]

Polyethylene resin, polypropylene resin, a polybutylene resin are nominated for copolymer alone, but, above all, polyethylene resin, polypropylene resin are preferable, and a particularly preferred thing is low-density polyethylene resin.

[0025]

Among copolymer with various principal monomer, ethylene - polar character principal monomer copolymer is given as a preferred person.

Above all, ethylene - (meta) methyl acrylate copolymer, ethylene - (meta) ethyl acrylate copolymer, ethylene - (meta) acrylic acid propyl copolymer, ethylene - (meta) butyl acrylate copolymer, ethylene - (meta) acrylic acid hexyl copolymer, ethylene - (meta) acrylic acid -2 - hydroxyethyl copolymer, ethylene - (meta) acrylic acid -2 - hydroxypropyl copolymer, ethylene - (meta) acrylate copolymer such as ethylene - (meta) glycidyl acrylate copolymer, ethylene - (meta) acrylic acid copolymer, ethylene - maleic acid copolymer, ethylene - fumaric acid copolymer, ethylene - ethylenic unsaturation acid copolymer such as ethylene - crotonic acid copolymerization, ethylene - acetic acid vinyl copolymer, ethylene - propionic acid vinyl copolymer, ethylene - butanoic acid vinyl copolymer, ethylene - vinylester copolymer such as ethylene - vinyl stearate copolymer or ethylene-stylene copolymer depends and is desirable.

More preferably, it is ethylene - vinylester copolymer, ethylene - (meta) acrylate copolymer, and a particularly preferred thing is ethylene - vinyl acetate copolymer.

Molecular weight of ethylene - polar character principal monomer copolymer should be the dimension which can form swabbing, dried back coating in base substance.

It is as for weight ratio 95/5 with ethylene and polar character principal monomer - 50/50.

[0026]

As for the organic pigment, a comparatively firm resin particle is used as doing with thermal ink transfer recording materials in what is used for fouling of non-pictorial image part, prevention of blocking for スティッキング, prevention of blocking for thermal ink transfer recording materials conventionally.

On the other hand,

It is for, and polyolefin resin corpuscle to apply to the present invention is used in ink acceptance propensity at the time of thermal ink transfer recording for prevention of スティッキング at the time of thermal recording.

Thus,

A comparatively soft resin particle is preferable, and what there is much, and used amount is used as in comparison with a conventional recording medium is desirable.

[0027]

When when average particle diameter of polyolefin resin corpuscle to apply to an overcoat layer in the present invention became less than  $1\mu\text{m}$ , thermal recording was performed, スティッキング is easy to be waked up, when when it was than  $20\mu\text{m}$ , average particle diameter performed thermal ink transfer recording, print barrier such as white foolishness is easy to become wake up so that adhesion with ink ribbon falls.

Thus,

$1 - 20\mu\text{m}$  are preferable, and it stops, and preferably average particle diameter of polyolefin resin corpuscle to apply to the present invention is  $2 - 15\mu\text{m}$ , and a particularly

preferred thing is 3 - 10  $\mu\text{m}$ .

[0028]

When solid content density 5 of the whole overcoat layer of polyolefin resin corpuscle to apply to an overcoat layer in the present invention performed thermal recording so that the polyolefin resin corpuscle which there was in the vicinity of coating surface decreased when it was in lower than % by weight, スティッキング is easy to become wake up.

On the other hand,

When it is than % by weight, binding capacity by binder is weak, and solid content density 90 in an overcoat layer of polyolefin resin corpuscle is easy to come to produce falling off of corpuscle, powdery oxidation coatings, falling off of hot printing ink are easy to become wake up.

Thus,

Preferred, as for solid content density 5 of polyolefin resin corpuscle in an overcoat layer in the present invention - 90 % by weight depends, and preferably it is 10 - 80 % by weight, and a particularly preferred thing is 15 - 70 % by weight.

[0029]

In addition,

When thermal recording was performed when it increased than 3g/m<sup>2</sup> in solid content with quantity of coating of an overcoat layer in the present invention, depression of coloring sensibility, depression of color optical density are caused so that heat transfer to feeling heat coloring layer falls.

Thus,

Less than 3g/m<sup>2</sup> are preferable in solid content, and it stops, and preferably coating quantity of an overcoat layer in the present invention is lower than 2.5g/m<sup>2</sup>, and a particularly preferred thing is lower than 1.5g/m<sup>2</sup>.

[0030]

Purpose is accepted, and, for support used for the present invention, as for the plastics films such as paper, various bonded mats, a fabric cloth, polyethylene terephthalate or polypropylene, the polyethylene, the paper laminate, the synthetic paper, the metallic foil such as aluminium, the glass that laminate did synthetic resin such as polypropylene or the composite sheets which put these together can be used optionally, but is not limited to these.

These are opaque, and transparency, either which are semitransparent are preferable.

A white pigment and existence dyeing pigment and air void may be incorporated into the whole support or surface to make the skin look like a particular color of white color others.

[0031]

Lamination of the thermal recording layer in the present invention can provide with interlayer between during the thermal recording layer and support or thermal recording layer and overcoat layers if necessary.

In addition,

When that is all for two levels of thermal recording layer, intermediate layer can be provided with between the different thermal recording stratum.

In these cases, as for two levels of intermediate layer - plural sheaf more than three levels may be comprised.

Furthermore, face of face and the opposite side which the thermal recording layer of support is installed in can be provided with recording layer of having many kinds such as Karl prevention, back coat layer aimed for static elimination or IJ recording layer aimed for a magnetic recording layer, ink jet printing aimed for magnetic recording.

[0032]

Each aqueous dispersion and binder - which the thermal recording layer in the present invention crushes color development component slightly, and is provided are mixed, because swabbing dries on support, it can be got.

For this case,

Plural color development component is incorporated into plural sheaf by a wish and are preferable as a multilayer construction, but what is incorporated into the same layer is desirable.

[0033]

Photothermal conversion material can be incorporated into arbitrary layer in thermal recording atmosphere and support to perform a print by a laser beam in thermal recording atmosphere of the present invention.

[0034]

In arbitrary sheaf of thermal recording atmosphere of the present invention, as necessary, such as diatom soil, purified talc, porcelain clay, baking kaolin, calcium carbonate, magnesium carbonate, titania, zinc oxide, silicon oxide, aluminium hydroxide, urea - formalin resin, inorganic, and, in addition, in addition, even more particularly, organic pigment, dispersing agent such as dioctyl sulfo sodium succinate can incorporate surface active agent and fluorescent dye with waxes such as zinc stearate, higher fatty acid metal salt such as calcium stearate, paraffin, oxidation paraffin, polyethylene, oxidation polyethylene, stearic acid amide, caster wax.

[0035]

In addition,

Oxidation inhibitor, UV absorber can be added for the purpose of improving in light resistance.

For oxidation inhibitor, hindered amine system oxidation inhibitor, hindered phenolic antioxidant and sulfide system oxidation inhibitor are given.

In addition,

For UV absorber, benzotriazole system UV absorber, salicyl acid system UV absorber, organic system UV absorber such as benzophenone system UV absorber and inorganic system UV absorber

such as zinc oxide, titania, cerium oxide are given.

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EXAMPLE

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[Example] An example explains this invention in more detail below. In addition, the following sections are the weight sections and % expresses weight %.

[0037] The ball mill ground the 3-dibutylamino-6-methyl-7-anilinofluoran 3 section which is the preparation black developed color precursor of the coating liquid for example 1 (A1) heat-sensitive-recording-layer formation with the polyvinyl alcohol water-solution 7 section 2%, and the color precursor dispersion-liquid 10 section with a volume mean particle diameter of 1 micrometer was obtained. Subsequently, the ball mill ground the 2 and 2'-screw {4-(4-hydroxyphenyl sulfonyl) phenoxy} diethylether 5 section which is a developer with the polyvinyl alcohol water-solution 10 section 2%, and the developer dispersion-liquid 15 section with a volume mean particle diameter of 1 micrometer was obtained. The two above-mentioned sorts of dispersion liquid were mixed, and the coating liquid for heat-sensitive recording layer formation was prepared.

[0038] (B) it becomes 10 g/m<sup>2</sup> to the paper of fine quality of basis-weight 50 g/m<sup>2</sup> as an amount of solid content smear about the coating liquid which consists of combination of the production baking kaolin 100 section of a sensible-heat coating form, the 50% styrene butadiene system latex water dispersion 24 section, and the water 200 section -- as -- coating -- it dried and the sensible-heat layer coating was produced.

[0039] (C1) The calcium-carbonate dispersion-liquid 10 section which grinds the 20% acrylic emulsion 45 of preparation section of the coating liquid for overcoat stratification, the 40% low consistency polyolefine dispersion-liquid (Mitsui Chemicals make: CHEMIPEARL M200, mean particle diameter of 6 micrometers) 45 section, and the calcium-carbonate 3 section with a homogenizer with the hexametaphosphoric acid sodium water-solution 7 section 2%, and is obtained was mixed, and the coating liquid for overcoat stratification was prepared.

[0040] (D1) Calender processing of the coating liquid for heat-sensitive recording layer formation prepared by (A1) was carried out so that the amount of solid content coating might become 5 g/m<sup>2</sup>, and the Beck smoothness of a coating side might become 400 – 500 seconds, after drying, coating, and the heat-sensitive recording layer was established in the sensible-heat coating form produced by production (B) of a heat-sensitive recording layer.

[0041] On the heat-sensitive recording layer prepared by (D1), calender processing of the coating liquid for overcoat stratification prepared by (C1) was carried out so that the amount of solid content coating might serve as 1.5 g/m<sup>2</sup>, and the Beck smoothness of a coating side might become 600 – 800 seconds, after drying, coating, and the thermal recording medium was produced.

[0042] The ball mill ground the 3 and 3-screw (p-dimethylamino phenyl)-6-dimethylamino phthalide 3 section which is the preparation blue developed color precursor of the coating liquid for example 2 (A2) heat-sensitive-recording-layer formation with the polyvinyl alcohol water-solution 7 section 2%, and the color precursor dispersion-liquid 10 section with a volume mean particle diameter of 1 micrometer was obtained. Subsequently, the ball mill ground the 2 and 2'-screw {4-(4-hydroxyphenyl sulfonyl) phenoxy} diethylether 5 section which is a developer with the polyvinyl alcohol water-solution 10 section 2%, and the developer dispersion-liquid 15 section with a volume mean particle diameter of 1 micrometer was obtained. The two above-mentioned

sorts of dispersion liquid were mixed, and the coating liquid for heat-sensitive recording layer formation was prepared.

[0043] (C2) The calcium-carbonate dispersion-liquid 10 section which grinds the 20% acrylic emulsion 45 of preparation section of the coating liquid for overcoat stratification, the 40% vinyl acetate system copolymerization polyolefine dispersion-liquid (Mitsui Chemicals make: CHEMIPEARL V300, mean particle diameter of 8 micrometers) 45 section, and the calcium-carbonate 3 section with a homogenizer with the hexametaphosphoric acid sodium water-solution 7 section 2%, and is obtained was mixed, and the coating liquid for overcoat stratification was prepared.

[0044] (D2) On the sensible-heat coating form produced by production (B) of a heat-sensitive recording layer, calender processing of the coating liquid for heat-sensitive recording layer formation prepared by (A2) was carried out so that the amount of solid content coating might serve as 5 g/m<sup>2</sup>, and the Beck smoothness of a coating side might become 400 – 500 seconds, after drying, coating, and the heat-sensitive recording layer was prepared.

[0045] On the heat-sensitive recording layer prepared by (D2), calender processing of the coating liquid for overcoat stratification prepared by (C2) was carried out so that the amount of solid content coating might serve as 1.5 g/m<sup>2</sup>, and the Beck smoothness of a coating side might become 600 – 800 seconds, after drying, coating, and the thermal recording medium was produced.

[0046] The dispersion-liquid 10 section which grinds the 20% acrylic emulsion 45 of preparation section of the coating liquid for example 3 (C3) overcoat stratification, and the high-density-polyethylene resin particle (Sumitomo Seika Chemicals make: flow bead HE3040, mean particle diameter of 12 micrometers) 18 section and the calcium-carbonate 3 section with a homogenizer with the hexametaphosphoric acid sodium water-solution 7 section 2%, and is obtained was mixed, and the coating liquid for overcoats was prepared.

[0047] On the heat-sensitive recording layer prepared by (D1), calender processing of the coating liquid for overcoat stratification prepared by (C3) was carried out so that the amount of solid content coating might serve as 1.5 g/m<sup>2</sup>, and the Beck smoothness of a coating side might become 600 – 800 seconds, after drying, coating, and the thermal recording medium was produced.

[0048] The polyolefine system resin particle used for an example 4 overcoat layer was changed into low-molecular-weight polyolefine dispersion liquid (Mitsui Chemicals make: CHEMIPEARL WF640, mean particle diameter of 1 micrometer) 40%, and also the same actuation as an example 2 was performed, and the thermal recording medium was produced.

[0049] The polyolefine system resin particle used for an example 5 overcoat layer was changed into the polyethylene resin particle (Sumitomo Seika Chemicals make: Fluothane UF20, mean particle diameter of 20–30 micrometers), and also the same actuation as an example 3 was performed, and the thermal recording medium was produced.

[0050] The 20% acrylic emulsion 95 of preparation section of the coating liquid for example 6 (C4) overcoat stratification and the low-density-polyethylene resin particle (Sumitomo Seika Chemicals make: flow bead LE 1080, mean particle diameter of 6 micrometers) 1 section were mixed, and the coating liquid for overcoat stratification was prepared.

[0051] On the heat-sensitive recording layer prepared by (D1), calender processing of the coating liquid for overcoat stratification prepared by (C4) was carried out so that the amount of solid content coating might serve as 1.5 g/m<sup>2</sup>, and the Beck smoothness of a coating side might become 600 – 800 seconds, after drying, coating, and the thermal recording medium was produced.

[0052] The 20% acrylic emulsion 50 of preparation section of the coating liquid for example 7 (C5) overcoat stratification and the low-density-polyethylene resin particle (Sumitomo Seika Chemicals make: flow bead LE 1080, mean particle diameter of 6 micrometers) 90 section were mixed, and the coating liquid for overcoat stratification was prepared.

[0053] On the heat-sensitive recording layer prepared by (D1), calender processing of the coating liquid for overcoat stratification prepared by (C5) was carried out so that the amount of solid content coating might serve as 1.5 g/m<sup>2</sup>, and the Beck smoothness of a coating side might

become 600 – 800 seconds, after drying, coating, and the thermal recording medium was produced.

[0054] The amount of solid content coating of an example 8 overcoat layer was made into 3 g/m<sup>2</sup>, and also the same actuation as an example 2 was performed, and the thermal recording medium was produced.

[0055] The homogenizer ground the 10% polyvinyl alcohol water-solution 20 of adjustments section of the coating liquid for example of comparison 1 (C6) overcoat stratification, the glyoxal denaturation object 2 section of polyacrylic acid, the calcium-carbonate 15 section, and the water 60 section, and the overcoat layer coating liquid for thermal recording material was prepared.

[0056] On the heat-sensitive recording layer produced by (D1), calender processing of the overcoat layer coating liquid prepared by (C6) was carried out so that the amount of solid content coating might serve as 1.5 g/m<sup>2</sup>, and the Beck smoothness of a coating side might become 600 – 800 seconds, after drying, coating, and the thermal recording medium was produced.

[0057] The moisture handbill pigment slurry was prepared for the adjustment calcium-carbonate 50 section of the coating liquid for example of comparison 2 (C7) overcoat stratification, and the sodium-polyacrylate 0.5 section. The styrene-acrylic organic pigment (Mitsui Chemicals make: gross DERU 162TX) 50 section was added to this pigment slurry, and the polyvinyl alcohol 20 section and the styrene-butadiene copolymerization latex 3 section were added and agitated, and it diluted with water, and considered as 35% of solid content concentration, and the coating liquid for overcoat stratification for thermal-transfer-recording material was prepared.

[0058] On the heat-sensitive recording layer produced by (D1), calender processing of the coating liquid for overcoat stratification prepared by (C7) was carried out so that the amount of solid content coating might be set to 2g/m<sup>2</sup>, and the Beck smoothness of a coating side might become 600 – 800 seconds, after drying, coating, and the thermal recording medium was produced.

[0059] Trial 1 The sensible-heat facsimile printing testing machine (TH-PMD) made from the Okura electrical machinery with the TDK print head (LH4409) was used for the thermal recording medium of the thermal recording trial examples 1-8 and the examples 1-2 of a comparison, and it printed by the applied voltage of 20 volts, and impression pulse 2.0 ms. The result of having observed sticking at the time of printing, printing dregs, and a quality of printed character by viewing is shown in Table 1.

[0060] Trial 2 After putting the hot printing ink ribbon on the coating side of the thermal recording medium of the thermal-transfer-recording trial examples 1-8 and the examples 1-2 of a comparison and heating by the applied voltage of 20 volts, and impression pulse 0.8 ms like a thermal recording trial, the ink ribbon was removed and the quality of printed character of an image was observed by viewing. The result is shown in Table 1.

[0061]

[Table 1]

	感熱記録			熱転写記録
	印字品質	スティッキング	カス	印字品質
実施例 1	◎	◎	◎	◎
実施例 2	◎	◎	◎	◎
実施例 3	◎	◎	◎	○
実施例 4	◎	○	◎	○
実施例 5	◎	◎	◎	○
実施例 6	◎	○	○	○
実施例 7	◎	◎	○	◎
実施例 8	○	◎	◎	◎
比較例 1	◎	◎	◎	×
比較例 2	×	×	△	△

[0062] The following valuation basis estimated the thermal recording trial in Table 1.

(1) Quality-of-printed-character O : the repeatability of a dot is extremely excellent.

O : the repeatability of a dot is good.

\*\*: The repeatability of a dot is inferior and it is inadequate for practical use.

x: The repeatability of a dot is very bad and is not suitable for practical use.

(2) Sticking O : there is no printing sound and excel extremely.

O : although there is a printing sound, there is no effect on an image.

\*\*: There is a printing sound and it has the influence on an image slightly.

x: There are a printing sound and a white kite of an image and it is not suitable for practical use.

(3) Dregs O : there is no adhesion of dregs and excel extremely.

O : although there is adhesion of dregs, there is no effect on printing.

\*\*: There is adhesion of dregs and it has the influence on printing slightly.

x: Dregs adhere, and it has the influence on printing, and is not suitable for practical use.

[0063] The following valuation basis estimated the thermal-transfer-recording trial in Table 1.

(1) Quality-of-printed-character O : the repeatability of a dot is extremely excellent.

O : the repeatability of a dot is good.

\*\*: The repeatability of a dot is inferior and it is inadequate for practical use.

x: The repeatability of a dot is very bad and is not suitable for practical use.

[0064] Since the thermal recording medium of examples 1-2 was using the low consistency polyolefin resin particle or the vinyl acetate system copolymerization resin particle for an overcoat layer, it is excellent in matching with a print head, and a binding property with a hot printing ink ribbon, and showed the good result also in any of thermal recording and thermal transfer recording, so that clearly from Table 1.

[0065] Although a result to which adhesion with a hot printing ink ribbon falls to, and a quality of printed character falls a little was brought since the particle was hard compared with low

consistency polyolefin resin when the high density polyolefin resin particle of an example 3 was used, and thermal transfer recording was performed, it was the level which is satisfactory practically.

[0066] Although the printing sound occurred when thermal recording was performed since adhesion with a print head became high when the mean particle diameter of the polyolefine system resin particle used for the overcoat layer of an example 4 was 1 micrometer, it did not accept, but there was no effect in an image, and adhesion of dregs was level which is satisfactory practically. On the other hand, since adhesion with a hot printing ink ribbon fell when the mean diameter of the polyolefine system resin particle used for the overcoat layer of an example 5 is 20-30 micrometers, although the quality of printed character of thermal transfer recording deteriorated a little, the repeatability of a dot was good and satisfactory practically.

[0067] Although generating of a printing sound and adhesion of dregs arose when thermal recording was performed since adhesion with a print head became high when the solid content concentration of the polyolefine system resin particle in the overcoat layer of an example 6 was 5 % of the weight, there was no effect on an image and it was satisfactory practically. Moreover, although the adhesion with a hot printing ink ribbon improved, binding capacity declined and printing concentration became low a little since there were few polyolefin resin particles when thermal transfer recording was performed, it was the level which is satisfactory practically.

[0068] On the other hand, although generating of printing dregs was slightly accepted when the solid content concentration of the polyolefine system resin particle in the overcoat layer of an example 7 was 90 % of the weight, and thermal recording was performed, there was no effect on an image and it was satisfactory practically.

[0069] When the amount of solid content coating of the overcoat layer of an example 8 was 3 g/m<sup>2</sup> and thermal recording was performed, since heat transfer to a heat-sensitive recording layer fell, although the quality of printed character deteriorated a little, it was satisfactory practically.

[0070] As mentioned above, the thermal recording medium which used the polyolefine system resin particle for the overcoat layer is excellent in the recording characteristic of both thermal recording and thermal transfer recording, and can respond to a recording method which is different with a single record medium.

[0071] On the other hand, although the good result was shown in the thermal recording trial in the example 1 of a comparison since the overcoat layer for thermal recording material was prepared, in the thermal-transfer-recording trial, a result to which hot printing ink acceptance nature is not sufficiently suitable for practical use was brought.

[0072] In the example 2 of a comparison, since the overcoat layer for hot printing television material was prepared, dregs and sticking occurred at the time of thermal recording, the white kite of printing happened, and a result which is not practical was brought. On the other hand, in the time of thermal transfer recording, since there were few amounts of coating of an overcoat layer, sufficient hot printing ink acceptance nature was not obtained, but printing KAKE of a thin line part was produced. Therefore, if the amount of coating of an overcoat layer is made to increase, a thermal-transfer-recording property can be made into the level which is not trouble practically. However, at the time of thermal recording, a sensibility fall, sticking, and printing dregs increase in this case. That is, the property of both thermal recording and thermal transfer recording cannot be satisfied only to the change in the amount of coating of the overcoat layer for hot printing television material.

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[Translation done.]

**\* NOTICES \***

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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**EFFECT OF THE INVENTION**

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**[Effect of the Invention]** The thermal recording medium of this invention can be recorded without producing sticking, printing dregs, etc. at the time of thermal recording, and, moreover, is extremely excellent in the repeatability of a dot. Moreover, also in thermal transfer recording, ink acceptance nature is extremely excellent in the repeatability of a dot well.

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[Translation done.]